Noise Impact Assessment

Site Address: 89 Oldham Street, Manchester, M4 1LW

Client Name: Closed Door Industries Ltd.

Project Reference No: NP-010216

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

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1 Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for the change of use of an existing ground floor retail unit into a bar ('the Proposed Development') at 89 Oldham Street, Manchester, M4 1LW ('the Site').

The applicant is preparing a planning application ('the Application') to be submitted to Manchester City Council. This report has been compiled to accompany the planning application.

A noise survey has been undertaken to establish the prevailing ambient and background sound levels at the Proposed Development site and the closest Noise Sensitive Receptors ('NSRs'). The findings have been subsequently used to assess the suitability of the site for the proposed use. Measures required to mitigate noise impacts have been assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Local Planning Authorities ('LPA') local plan and technical guidance, specifically, Manchester City Council's 'Planning and Noise Technical Guidance October 2022'
- National Planning Policy Framework (2023)
- Noise Policy Statement for England (2010)
- British Standard BS4142:2014+A1:2019 – 'Methods on rating and assessing industrial and commercial sound'
- ProPG: 'Planning and Noise 2017' (including supplementary documents 1 & 2)
- IEMA 'Guidelines on Noise Impact'
- Entertainment Noise Legislation

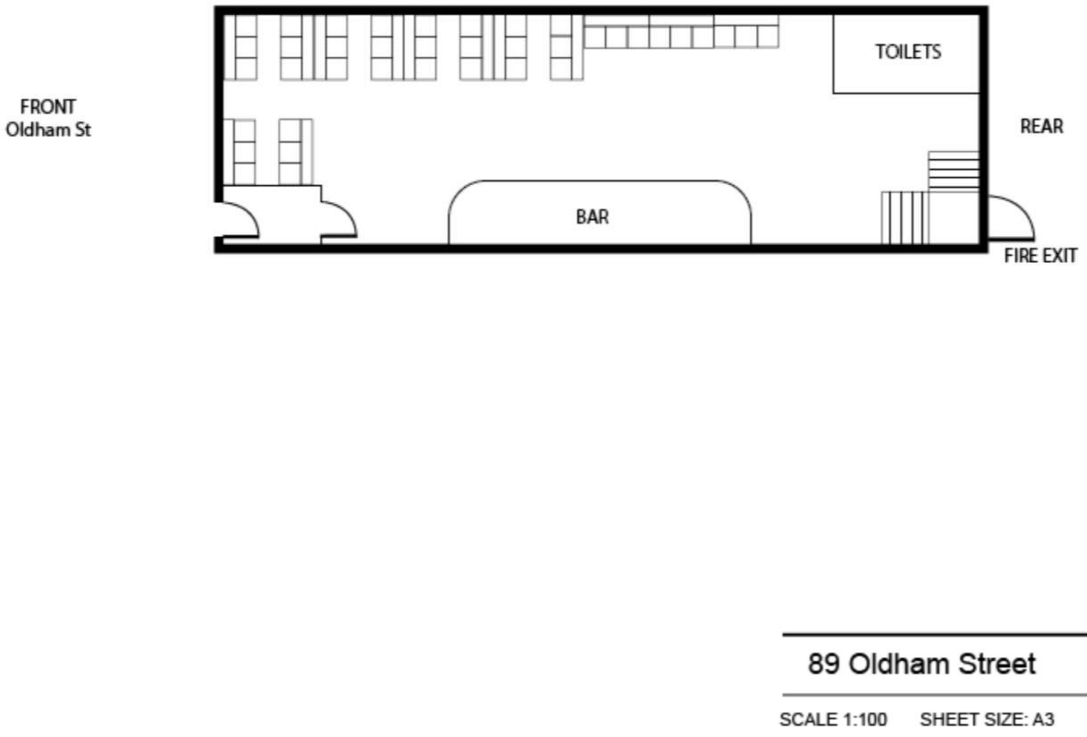
Further information on the legislation can be found in Appendix B.

1.2 Proposal Brief

NOVA Acoustics has been informed of the following relevant information regarding the Proposed Development:

- Conversion of existing ground floor retail unit into a bar venue (use Class E(b)),
- Conversion of commercial spaces above the proposed bar venue into flats,
- Proposed opening times are to be 12:00pm (Midday) – 02:00am (The following morning),
- The venue capacity is expected to be up to 100 patrons,
- There will be no live music, only pre-recorded music playback,
- As shown on the plan, there will be an entrance lobby with two sets of doors.

Figure 1 below shows the Proposed Development



Drawing provided by client

Figure 1 – Proposed Development

2 Environmental Noise Survey

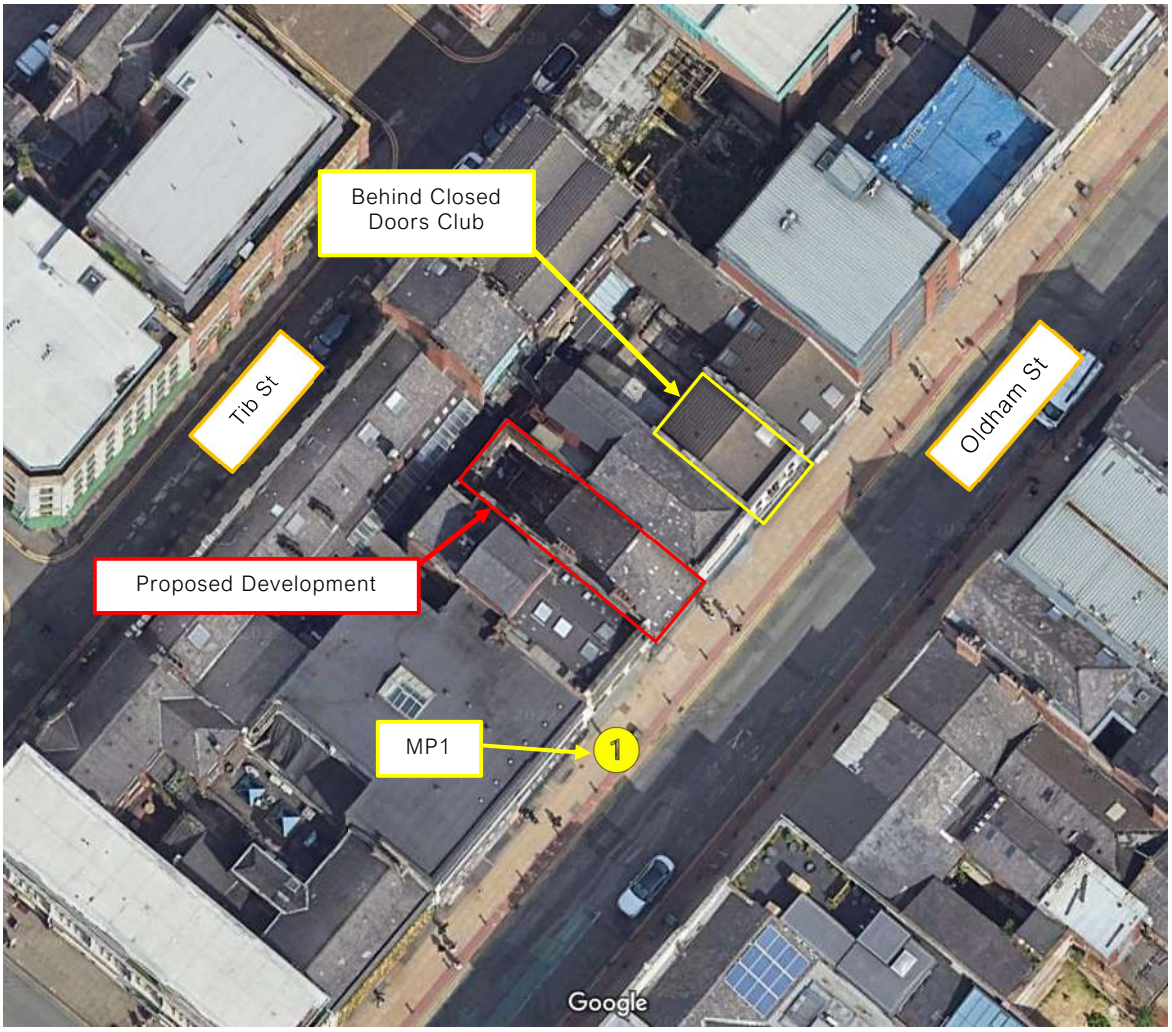
2.1 Measurement Methodology

The following table outlines the measurement dates and particulars.

Location	Survey Dates	Measurement Particulars
MP1	10 – 13/11/2023	Microphone affixed to a lamppost, in free field conditions approximately 4m from ground level.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement location:



Imagery ©2023 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2023

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The area surrounding the site comprises primarily of commercial premises with a minority of upper floor residential flats. The acoustic environment of the area is deemed to be moderate to high in level and the noise profile is dominated by road traffic noise emissions from Oldham Street. During the site visits, noise from the surrounding retail and entertainment units was found to be secondary in nature. A club which

operates until 4am is located approximately 11m to the northeast of the proposed development. As can be seen in the time history graph in Appendix D, it is likely that this is a significant contributor to the noise environment during the early morning periods.

2.3 Environmental Noise Survey Results

Background Sound Level Analysis – Noise Breakout

The following table outlines the lowest background sound levels ($L_{A90,T}$) measured during the most sensitive proposed operational hours that have been used in the subsequent noise breakout assessment.

Location	Measurement Period ('T')	Octave Frequency Band (Hz, $L_{90,T}$, dB)								$L_{A90,T}$ (dB)
		63	125	250	500	1k	2k	4k	8k	
MP1	Daytime: 19:00 – 23:00	59	57	55	56	53	50	44	36	58
	Night-time: 23:00 – 02:00	60	55	54	57	52	49	42	32	58

Table 2 – Background Sound Level Results Summary – Noise Breakout

3 Noise Breakout Assessment

3.1 Guidance and Acoustic Design Criteria

The most appropriate guidance has been taken from 'The Good Practice guide on the Control of Noise from Pubs and Clubs' compiled for DEFRA. The document comments that where entertainment noise takes place on a regular basis, music and associated sources should be inaudible within noise-sensitive properties at any time. In general, it is assumed that relative inaudibility can be achieved within dwellings providing the music noise does not exceed the background noise level in any frequency band.

Manchester City Council Criteria

Manchester City Council's *'Planning and Noise Technical Guidance October 2022'* document also states that noise emanating from entertainment premisses should not be audible within any noise sensitive residential properties. The document goes on to state the following criteria:

"Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5 dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location."

3.2 Noise Breakout Assessment

Predicted Internal Noise Level

The predicted reverberant internal noise levels within the proposed bar have been taken from the ANC's 'Little Red Book of Acoustics'. The book gives internal noise levels for a 'Busy Pub/Bar' which are thought to be robust for a development of this size, however, given the potential for a greater patronage than is accounted for in the ANC guidance, a 3 dB increase in loudness at all frequency bands has been applied to allow for a worst-case scenario.

Description	Octave Frequency Band (Hz, dB)							Overall (dBA)
	63	125	250	500	1k	2k	4k	
Internal Noise Level of Proposed Bar (L_{eq})	80	85	85	85	85	80	70	88
Adjusted Internal Noise Level (L_{eq})	83	88	88	88	88	83	83	92

Table 3 – Reverberant Internal Noise Level of "Busy Pub/Bar"

Baseline Minimum Proposed Building Envelope

The following assumptions have been made regarding the construction details of the building fabric considering the results of the site visit.

- Single glazing on the street facing façade:
  - 6mm Laminated Glass,
- The façade:
  - 200mm brick wall
  - 50mm stud with 50mm insulation
  - 10mm plasterboard

In addition to the sound insulation specification stated above, the following measures should also be taken to minimise unwanted noise breakout:

- All external door sets should be a solid core construction and provide a minimum 40 dB R_w of sound reduction. Lobbied door systems should be installed where any external door sets open into the function suite. All windows and doors should remain closed when amplified music is playing.
- Heating and cooling should be provided by air-conditioning systems so there will be no requirement for the ventilation systems to penetrate the façade and compromise the sound insulation of the building.

The table below outlines the minimum sound reduction of each element predicted using INSUL 9.0 software.

Description	Octave Frequency Band (Hz, SRI, dB)							R_w (dB)
	63	125	250	500	1k	2k	4k	
6mm Laminated Glazing	19	21	25	29	34	35	41	33
Brick and Board Façade	41	39	42	50	58	62	67	54

Table 4 – Predicted Sound Reduction of Building Fabric Elements

3.3 Noise Breakout Assessment

The resulting L_{eq} noise breakout emissions at the most affected NSRs have been assessed against the adopted criteria in the figures below.

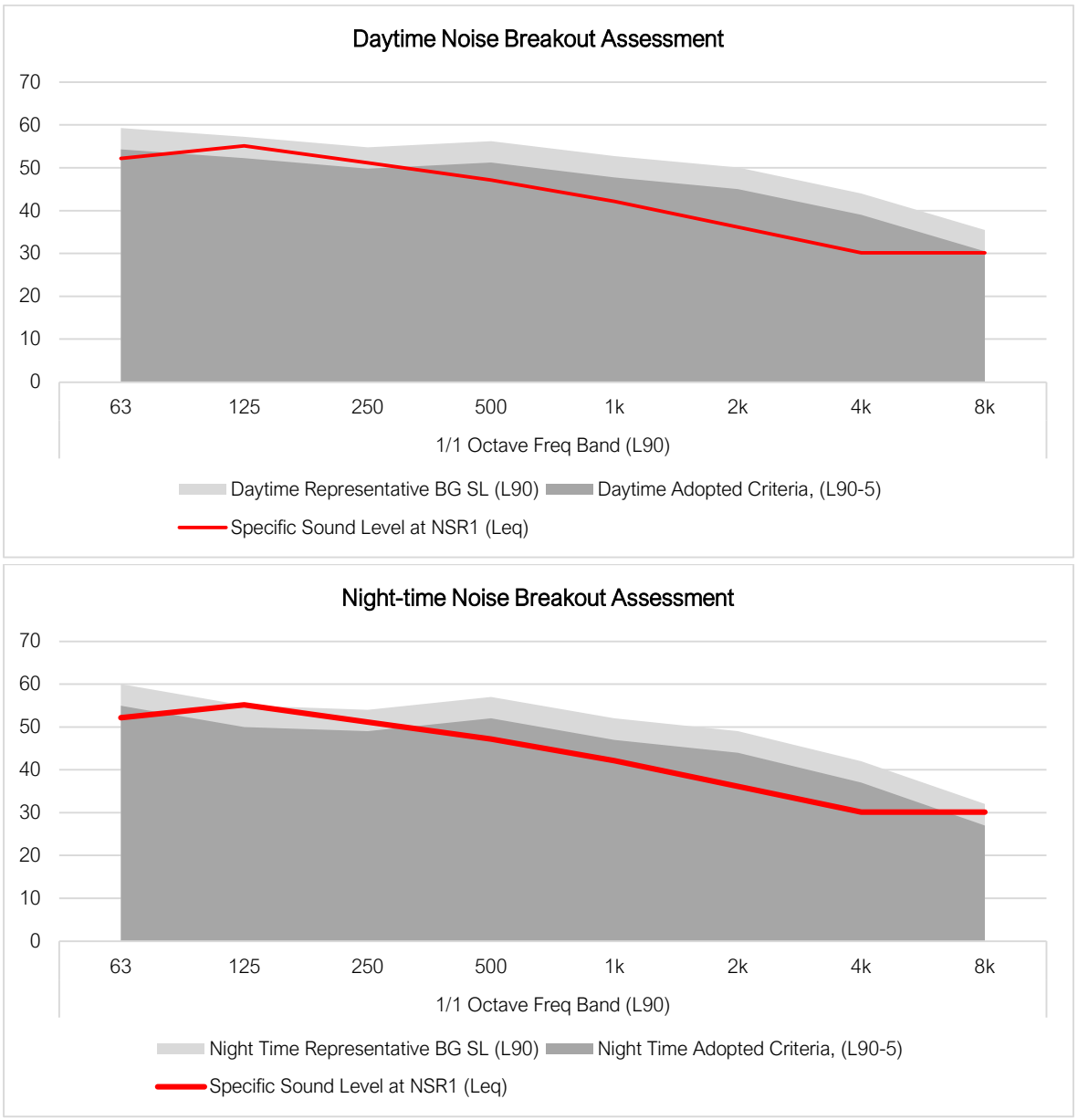


Figure 3 – Noise Breakout Assessment

Description	Octave Frequency Band (Hz, SRI, dB)								Overall A (dB)
	63	125	250	500	1k	2k	4k	8k	
Daytime Exceedance	-2	+3	+1	-4	-6	-9	-9	0	-10
Nighttime Exceedance	-3	+5	+2	-5	-5	-8	-7	+3	-10

Table 5 – Predicted External Noise Level Exceedances at NSR

The assessment above shows that the predicted levels of noise breakout exceed the adopted criteria in the 125Hz, 250Hz and 8kHz octave frequency bands. These exceedances are an indication of possible adverse impact for the NSR directly above. Consequently, mitigation measures are deemed to be necessary.

3.4 Recommendations & Mitigation Measures

In order to achieve the criteria, it is recommended that a music noise limiter is installed that is capable of limiting noise at specific frequencies. The following maximum amplified music limit levels should be adhered to as shown in the following table.

Description	Octave Frequency Band (Hz, L_{eq} dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8K	
Maximum Amp Music Limit Levels	83	83	86	88	88	83	83	80	92

Table 6 – Maximum Amplified Music Limit Levels

An example system which could be used is the 'Cesva LRF04-F – Frequency Filter Sound Level Limiter-recorder', however, other systems are available.

External acts or DJs should be prohibited from using their own equipment unless plugged into the main FOH system through the volume control measures. The noise limiter must be installed and activated by an appropriately experienced noise control consultant/engineer to ensure that the equipment operates effectively.

The music limit levels above should be set as a baseline, and during the calibration of the equipment, the limit levels should be adjusted to achieve inaudibility at the closest NSRs.

Further to this, to minimise the internal sound level required to achieve a uniform and distributed noise level within the venue, it is recommended that a multi-speaker P.A. system is installed. This will allow the venue to have full control of the maximum noise level and will bring the speakers closer to the patrons, allowing for the overall noise level to be reduced whilst retaining a feeling of loudness. This will require further design guidance from the PA system installation company.

4 Noise Breakthrough Assessment and Sound Insulation Scheme

4.1 Noise Breakthrough Criteria

The proposed development structurally adjoins commercial properties via separating walls and floor. BS8233:2014 states that the internal noise criteria includes 'overall noise' which is the sum of structure borne and airborne noise sources. Noise breaking through from structurally adjoining commercial property will be considered to ensure the total noise from both structurally adjoining commercial properties and external noise ingress, does not exceed the proposed acoustic design criteria. Guidance on sound insulation between adjoining domestic and non-domestic dwellings is discussed in Approved Document E (ADE) of the Building Regulations, section 0.8 of Part E states.

> *"The performance standards set out in Tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level."*

The higher standard of sound insulation required is dependent on the level of noise generated within the commercial property. Noise from structurally adjoining commercial sources can lead to elevated impact and as such further consideration is given to the level of audibility, dominance, attention grabbing features, spectral distribution, regularity, change in level, duration, and time of day the sound is occurring. The commercial properties 'Use Classes' can assist in defining a suitable higher standard of sound insulation.

4.2 Noise Breakthrough Assessment and Specification

The following table outlines the expected level of risk associated with the 'Class Use' of the structurally adjoining commercial property and provides a required sound insulation standard including a discussion to justify the standard.

Planning Class	Level of Risk from Noise	Required Sound Insulation Standard (dB)
E(b) Sale of food and drink for consumption (mostly) on the premises	High	≥65 $D_{nT,w} + C_{tr}$

Discussion: The noise emissions produced by food and drink premises includes both amplified music and noise from patrons. Amplified music associated with primarily drinking premises is normally of an elevated level and will be considered in this assessment. The noise from patrons can vary significantly and is highly dependent on the nature of the establishment. The required level of sound insulation should consider raised and elevated vocal efforts occurring regularly. The permitted opening hours extend into the night-time period (23:00 – 02:00) and as such the sensitivity of the adjoining residential requires additional consideration during this period.

Table 7 – Noise Breakthrough Assessment

An indicative specification that can achieve the required sound insulation standard which is based on the existing buildup is outlined below. The airborne sound reduction provided by the proposed system has been modelled in INSUL 9.0.

Floor Specification:

- 8mm mass-loaded vinyl (min. density of 2500 kg/m^3, e.g., iKoustic MuteBarrier)
- 1 No. 18mm chip board or existing floorboards
- Existing 200mm timber joists with 150mm Rockwool RW3 insulation (60kg/m^3) tightly and evenly fitted between joists.
- 50mm air cavity
- 100mm independent timber joists with no structural ties and 50mm Rockwool RW3 insulation (60kg/m^3) tightly and evenly fitted between joists*
- 2 No. 15mm SoundBloc plasterboards (with overlapping joints and sealed with flexible mastic at the perimeter)

**Where structural ties are required, these should be connected via acoustic hangers and kept to the minimum possible.*

It should be noted that this report provides an indicative specification that can achieve the required acoustic performance and considers that all flanking routes for sound have been appropriately suppressed. As with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection. The development cannot achieve compliance until sound insulation testing is carried out by a UKAS accredited sound insulation testing company upon completion and assessed against the required sound insulation standard.

5 BS4142 Plant Noise Limit Level

The proposed plant equipment specification has not yet been finalised; however, it is expected that an air conditioning system may be required in order to maintain a comfortable environment. As such, a plant noise limit level has been defined to ensure that the noise emissions do not exceed the background sound levels at the closest NSRs. The limit level is inclusive of any rating penalties that should be applied to account for audible characteristics of the noise which could be deemed to cause increased annoyance, such as intermittency, impulsivity, or tonality. The limit levels have been calculated for the operational periods of the Proposed Development.

The calculated plant noise limit levels are shown in the table below.

BS4142 Plant Noise Limit Levels	
Description	**Daytime and Night-time (dBA)**
Background Sound Level (L_{A90})	58
Cumulative Plant Noise Limit Level at NSR (L_{A90} – 10 dB)	53
BS4142 Assessment Outcome	Assessment indicates 'Low Impact, dependent on context'.
NPPF & NPSE Outcome	The assessment outcome would be classed as 'No Observed Effect Level ('NOEL').

Table 8 – BS4142 Plant Noise Limit Levels

6 Noise Management Plan

This Noise Management Plan ('NMP') outlines the methods by which the venue manager will systematically assess and minimise the potential impacts of noise generated by the site. The NMP is a working document with the specific aim to ensure that:

- Noise impact is considered as part of routine inspections,
- Noise is primarily controlled at source by good operational practices, including physical and management control measures,
- All appropriate measures are taken to prevent or, where that is not reasonably practical, to reduce noise emissions form the venue.

6.1 Hours of Operation

The following operating hours shall be adhered to:

- The venue may operate between 12:00 (midday) and 02:00 hours.
- Amplified music shall not be played after 02:00 hours.
- An additional 15 minutes after the hours stated above shall be allowed for patrons to exit the premises.
- An additional 1-hour before and after the hours stated above shall be allowed for staff only for the purposes of preparation, cleaning and other ancillary activities associated with the operation of the business.

6.2 Internal Amplified Music Noise Levels

- An amplified music limiting device shall be installed within the function room capable of controlling noise levels to the values presented in Table 6.
- The music limit levels stated in this report must be considered as a baseline, and during the calibration of the equipment, the limit levels should be adjusted to achieve inaudibility at the closest NSRs.
- External acts or DJs should be prohibited from using their own equipment unless plugged into the main FOH system through the volume control measures. The noise limiter musts be installed and activated by an appropriately experienced noise control consultant/engineer to ensure that the equipment operates effectively.
- A distributed P.A. system shall be installed to minimise the internal sound level required to achieve a uniform and distributed music level.
- All windows and doors will remain closed at all times. All heating and cooling will be provided by air-conditioning systems so there will be no requirement for the ventilation systems to penetrate the façade and compromise the sound insulation of the buildings.
- Any external door sets will provide a minimum sound reduction of 40 dB R_W and lobbied door systems shall be installed where any external door sets open into a space where amplified music is to be played.

6.3 External Patron Noise

- Patrons shall not be allowed to congregate outside the premises.

- Patrons using the external areas will be made aware that the venue has residential neighbours and that shouting and raised voices are unacceptable. If patrons frequently violate this, they will be asked to move inside the venue.

6.4 Dispersal of Customers

During the final 20 minutes of trading the following strategies will be implemented:

- Ambient lighting level will be gradually increased,
- Slower music will be played at a reduce volume,
- Music will cease playing 10 minutes prior the closure of the premises.

A member of staff will be positioned in an area close to the main exit to oversee the end of night departure period to ensure that:

- Patrons are encouraged to be considerate upon leaving the premises,
- Patrons do not leave the premises other than by the doors and exits they are guided towards,
- Communication is made with taxi companies regarding the use of horns and slamming of doors.

Further to this, prominent, clear and legible notices will be displayed at the exit(s) requesting the public to respect residents and to leave the premises and the area quietly.

6.5 Continuous Subjective Noise Monitoring

- All staff will, as part of their induction, be made aware of the surrounding NSRs and the effects of noise on residential dwellings. It is the responsibility of all staff to be aware of noise on site and to report any potential noise issues to the premises manager at the earliest opportunity.
- All staff will have refresher training on noise issues, prevention and managements at six-monthly intervals.

6.6 Noise Complaint Investigation

An Issue Management System ('IMS') will be implemented and completed by the venue manager. This will include records of subjective noise monitoring and complaints. Further to this, a complaints procedure will be implemented. This procedure will allow for all complaints, feedback and requests made by third parties regarding the premises operational activities. An example complaints logging form is included in Appendix A.

A phone number for the premises will be made available online to allow any member of the public to lodge a complaint without entering the premises. The premises manager will be specifically assigned to deal with complaints.

All complaints received from third parties including statutory authorities, statutory consultees, members of the general public and representatives of the company will be forward to the premises manager to action as below within 1-hour (where feasible). The complaint will be logged in the complaints log within 24-hours.

The operations manager will ensure that:

- The complaint is investigated to identify the cause, if necessary, this may involve direct communication with the complainant.
- In the event of elevated noise being detected, action will be taken immediately to prevent a recurrence of the same problem. These actions must be documented.
- The complainant will be contacted and given information on the investigations conducted and actions taken as appropriate.
- Details of other complaints are sent to other company personnel as appropriate.
- If the investigation indicates that the complaint has not been justified this will be clearly recorded on the incident report.
- All complaints will be logged.

The NMP will be reviewed annually or as agreed appropriate to ensure it is streamlined and effective. New and innovative approaches to problem-solving or incidents and any lessons learnt will be incorporated accordingly.

This is considered to be a 'live document' which evolves by experience in agreement with the Local Authority.

A subjective monitoring guide is shown below:

Premises: _____ Event: _____

Date: _____ Event start time: _____:_____ Event End time: _____:_____

Pre-start checklist:

- Windows & doors closed: Y/N
- Sound check and volume set: Y/N
- Agree who will complete objective noise monitoring & when: Y/N
- Check sound limiter is fully operational: Y/N
- Set end-time with performer(s): Y/N
- Complete monitoring form: Y/N

Subjective Noise Monitoring Guide			
Assessment		Description	Guide / Action
A	Not audible at NSRs.	No Entertainment Sound audible.	Okay
B	Just audible at NSRs.	Muffled sound, vocals/music not clear, easily masked by other ambient noise in area.	Okay, but adjust noise level to A.
C	Clearly audible at NSRs.	Clear vocals/music and likely to be heard by neighbours.	Reduce to B immediately, and aim to reduce to A.
D	Loud at NSRs.	Vocals/music are dominant and would be clearly heard by neighbours.	Not acceptable.

Figure 4 – Subjective Noise Monitoring Record

7 Conclusion and Action Plan

The proposed development has been assessed against the acoustic design criteria and the planning Conditions imposed by the LPA, and a sound insulation scheme has been provided to ensure the criteria has been achieved.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are implemented:

1. The noise breakout mitigation outlined in Section 3.4 should be implemented and prior to the first operation and retained thereafter.
2. Any external fixed plant that may be installed should not exceed the cumulative plant noise limit levels presented in Section 5. These are inclusive of any BS4142 acoustic feature corrections. Once the plant units are specified the noise emissions should be calculated by an appropriately qualified person to ensure that the limit levels are achieved.
3. The noise management plan shown in Section 6 should be correctly implemented.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Background Sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for N% of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10\log_{10}(p/p_0)^{2.}$ Where: p is the root-mean-square sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2023)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2023. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 174e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 185 states:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) *Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
b) *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
c) *Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 185 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS8233:2014 'Guidance on Sound insulation and noise reduction for buildings'

BS8233 provides guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, 'WHO Guidelines on Community Noise, 1999'. The Guidelines on Community Noise (1999) document defines community noise to include noise from "industries" and "construction". The desirable criteria levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below.

BS8233:2014 Internal Ambient Noise Level Criteria			
Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB L_{AFmax}*

Table 9 – BS8233:2014 Internal Ambient Noise Level Criteria

**ProPG:2017 states that's good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{AFmax} more than 10 time a night within noise sensitive rooms such as bedrooms. However, where it is not reasonably practicable to achieve the guideline then the judgment of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number distribution, predictability and regularity of noise events.*

It is noted, however, that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the 'LOAEL' as defined in the NPSE in Appendix B.

B.4 – Entertainment Noise Legislation

Noise from entertainment venues, e.g., noise from recorded music, live bands or karaoke, ca be particularly annoying for residents and business if it is not adequately contained within the venue. When considering the potential impact of a proposal for a entertainment premises or residential near to entertainment premises a consideration for the overall noise level (L_{Aeq}) and the 63Hz and 125Hz octave band noise levels. Music noise in the 63Hz and 125Hz octave bands, which is described as 'bass noise' is particularly difficult to contain and the impulsive and non-steady character of low frequency music noise is particularly disturbing for residents exposed to it.

A lively city centre bar can operate around 95 dB L_{Aeq} and nightclubs can be even higher at 105 dB L_{Aeq}. The range of level of 63Hz and 125Hz octave bands is wider than the a-weighted levels and can be up to 115 dB L_{eq} and 110 dB L_{eq} respectively (Davies et al 2005).

There is a lack of consensus on an assessment method for noise levels within habitable rooms regarding entertainment noise. The design aim should be to design to 'inaudible'*. The building structure is therefore key and will usually involve a high performing solution in either the music venue or residential premises. Existing noise standards/criteria are not appropriate for evaluating low frequency noise; in almost all other situations the established noise descriptors are based on the A-weighted sound level (dBA) which effectively filters out low frequency sound (Moorhouse et al 2011).

**Noise is considered to be inaudible when it is at a sufficiently low level such that it is not recognizable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question. The DEFRA report 'Noise from Pubs and Clubs – Phase 1', which, on page 17 reproduces the Institute of Acoustics (IOA) working group guidance to achieve music noise levels which are 'virtually inaudible' inside a residential property.*

When dealing with noise control, especially at the lower frequencies it is usual to look at the octave band data as a Z-weighting (linear) and not the A-weighting, due in main to the amount you have to 'take off', resulting in meaningless data (-26.2dB at 63Hz) and also with respect to the sound insulation performance of various constructions materials. Rather than just A-weighted levels being assessed e.g., internal noise levels as per BS8233:2014; a low frequency band analysis should be carried out (McCullough et al 2004).

In the 'Procedure for the assessment of low frequency noise complaints – Revision 1', Moorhouse et al (2011) use limits for low frequency noise levels in 1/3 octave bands between 10Hz and 160Hz. For the assessment of low frequency music noise, it is more practical to consider the 63Hz and 125 Hz octave bands. The Noise Council's Code of Practice on 'Environmental Noise Control at Concerts' suggests limits on both these octave bands. The DEFRA report 'Noise from Pubs and Clubs – Phase 1' suggests limits on 1/3 octave bands. However, the problem with this suggestion, and one of the reasons it is not widely used, is due to the difficulty in obtaining 1/3 octave band sound insulation performance data for various construction materials. With regards to assessing music noise at the 63 Hz and 125 Hz octave band levels a good correlation is shown between the NR 15 curve and Moorhouse curve at low frequencies. See figure below.

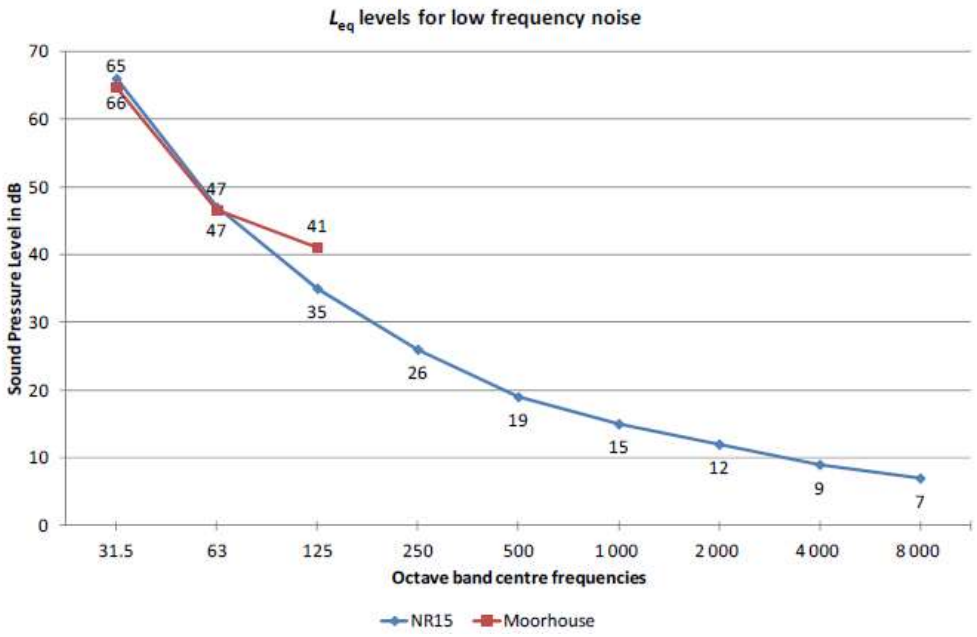


Figure 5 – Moorhouse Low Frequency Noise Rating Curve

However, The NR curve may be too stringent at mid and higher frequencies and may be lower than background noise levels in habitable spaces. Further, the NR curve is most commonly used to set limits for mechanical services noise in buildings i.e., steady, continuous noise sources. Music noise has distinctive characteristics and as such can be described as unsteady and non-continuous in comparison.

Even though the Moorhouse curve does not specifically relate to entertainment noise (as per the caveat in the revised edition) these levels provide a good practical basis to assess low frequency music noise. They also provide a workable prediction for planning applications and a measurement method and assessment for in-situ low frequency issues in existing habitable spaces. Therefore, a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be: 'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (L_{eq}), respectively'. This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.

References:

i) Institute of Acoustics (2002) – Good practice guide on the control of noise from pubs and clubs – Draft Annex 2.

ii) McCullough et al (2004) A practical evaluation of objective noise criteria used for the assessment of disturbance due to entertainment music

iii) Moorhouse et al (2005) Proposed criteria for the assessment of low frequency noise disturbance, Defra (updated in 2008 and 2011)

Appendix D – Environmental Survey

D.1 – Time History Noise Data

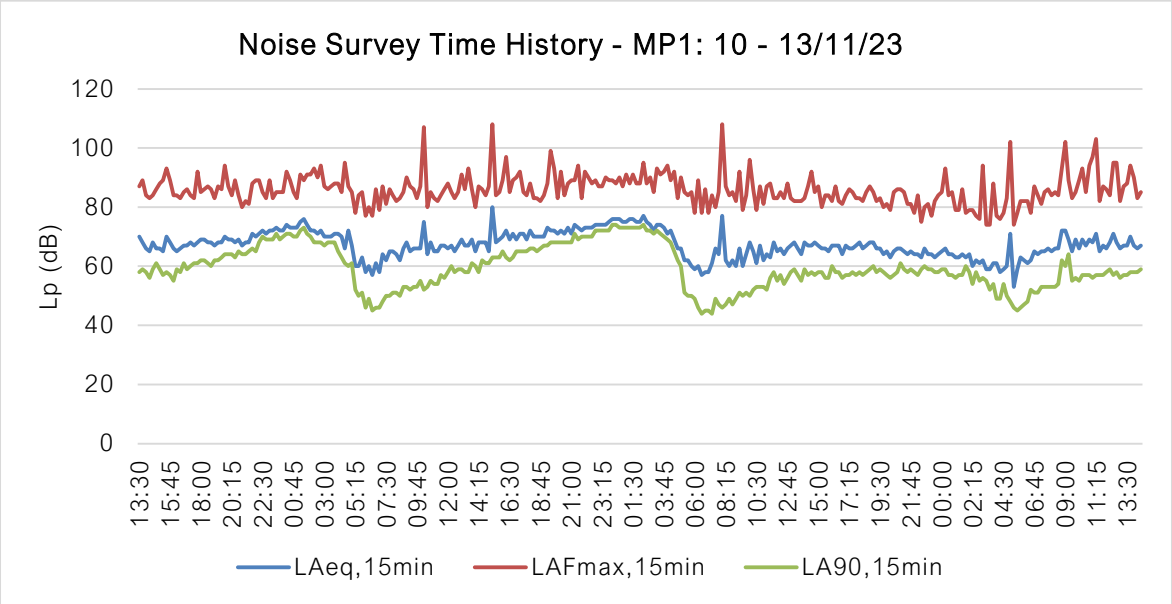


Figure 6 – MP1 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T246458	≤0.1
CESVA CB006 Class 1 Calibrator	901927	

Table 10 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.1dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

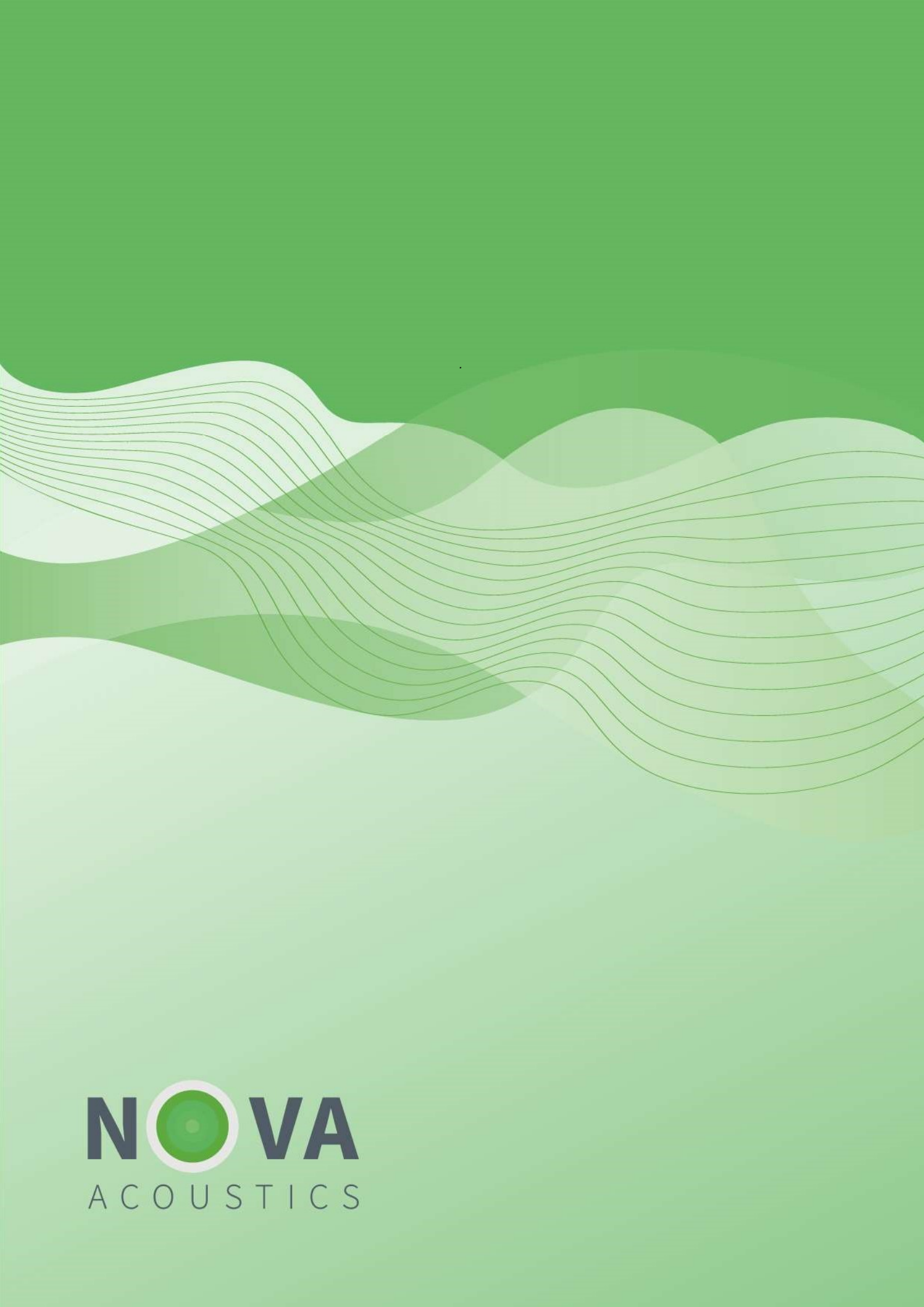
D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445

Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Chorlton, Manchester (3.5km SW of Site)				
Time Period	Air Temp (^{0}C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
10/11/23: 00:00 – 23:59	1.9 – 9.7	0.0 – 6.0	S	0.0 – 2.2
11/11/23: 00:00 – 23:59	-0.3 – 10.5	0.0	SE	0.0 – 1.0
12/11/23: 00:00 – 23:59	0.1 – 8.2	0.0 – 4.8	ESE	0.0 – 1.7
13/11/23: 00:00 – 23:59	8.2 – 12.9	0.0 – 3.0	S	0.0 – 6.3

Table 11 – Weather Conditions


NOVA
ACOUSTICS